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ABSTRACT

Very preliminary systems concepts are presented for the Order and Standard Loan Subsystems. Each of the tasks defined for the current manual operations in (Library Systems Development) LSD 70-60 are evaluated against these concepts to determine how existing work will change when mechanized systems are installed. Then, utilizing this qualitative assessment, estimates are made of the percentages of the existing work which would be replaced by machine operations. Ranges of replaceability estimates are presented for both MAIN and SECONDARY operations. (Other documents on this program are: LI 003640 and 003641.) (Author)

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LIBRARY SYSTEMS DEVELOPMENT PROGRAM

LSD 71-17

CONCEPTUAL REPLACEABILITY ANALYSIS
for
ORDER AND STANDARD LOAN TASKS

February 5, 1971

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Very preliminary systems concepts are presented for the Order and Standard Loan Subsystems. Each of the tasks defined for the current manual operations in LSD 70-60 are evaluated against these concepts to determine how existing work will change when mechanized systems are installed. Then, utilizing this qualitative assessment, estimates are made of the percentages of the existing work which would be replaced by machine operations. Ranges of replaceability estimates are presented for both MAIN and SECONDARY operations.

SANTA BARBARA, CALIFORNIA 93106

TO: Campus Resource Personnel
UNCLSTAF

FROM: Fred Bellomy

SUBJECT: Conceptual Replaceability Evaluation for Order and Standard Loan Tasks

REF: (1) A Background for the Cost Analysis..., LSD 70-60, 18 December 1970.

(2) UC Library Systems Definitions..., LSD 71-5, January 1971.

(3) Standard Loan Subsystem Automation,... HAS 70-10, 4 December 1970.

I. PURPOSE

The following discussions represent very preliminary conceptual statements about the nature of the new mechanized Order and Standard Loan Subsystems which are to be developed under the UCLSO Program. While prior work performed by Herb Ahn of UCI, Pat Gebhard of UCSB, Bob Foulkes of UCSD, Justine Roberts of UCSF and Nancy Smith in the Program Office have provided important inputs to this analysis, the discussions presented here are heavily biased by my own personal knowledge of systems requirements at a large number of institutions including all of the campuses of the University of California.

This analysis is presented for four reasons. First, it is a means of starting the debate on the nature of the new mechanized systems which will be developed for the University of California. Second, there is an urgent need to assess in greater detail the potential replaceability of existing manual tasks now being performed as a part of current operations. The results of this assessment will be used to project the portion of future personnel budgets which could be diverted to the support of mechanized operations. Third, a preliminary systems concept is required in order to project the probable hardware requirements for new systems. Fourth, a gross description of the possible characteristics of new systems is necessary to make reasonable assessments of po-

tential improvements in library operations which can result from the development of new systems.

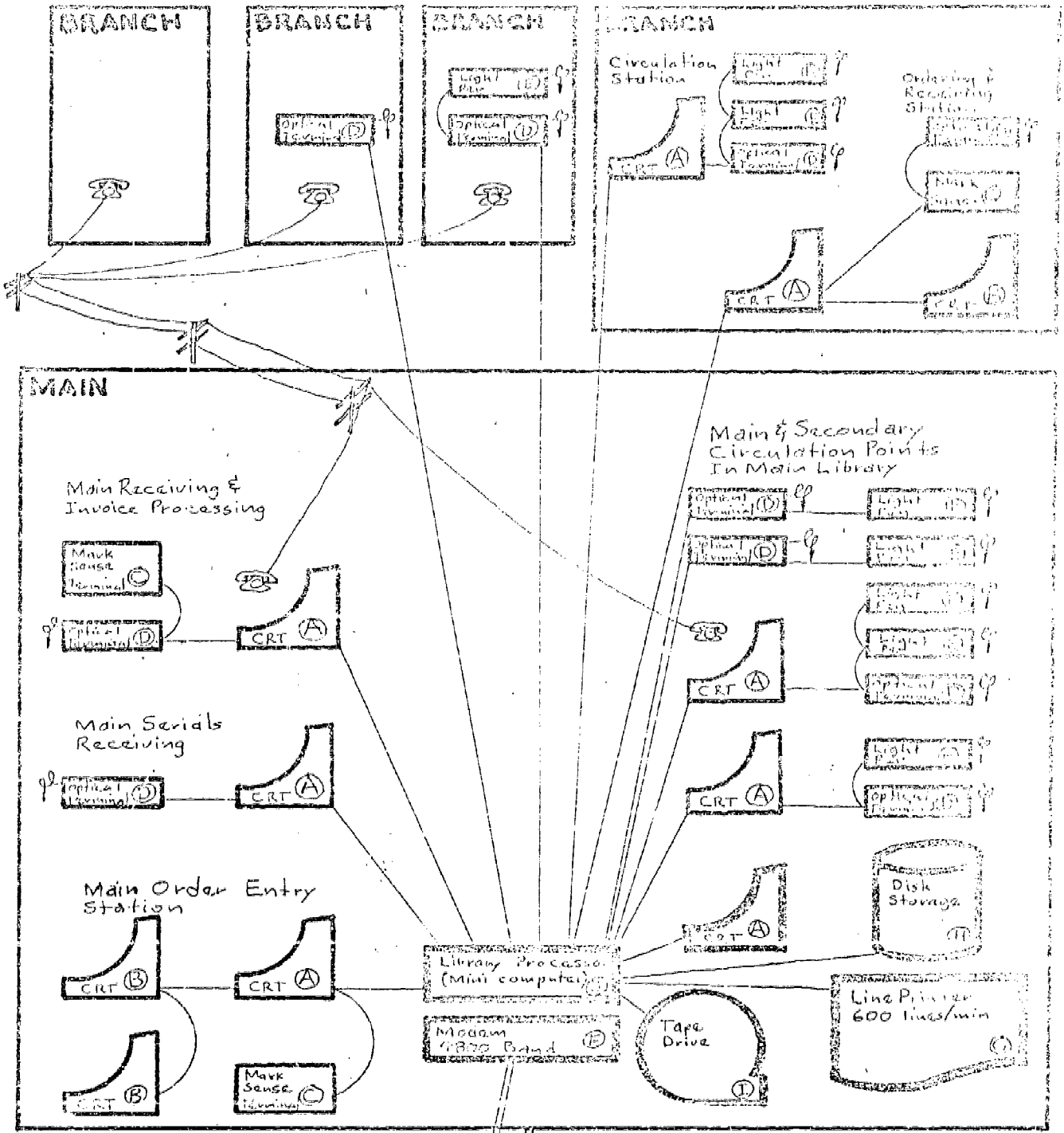
II. ASSUMPTIONS

The discussions in Sections III and IV are organized to parallel exactly the task definitions presented in References 1 and 2. Based on the assessment presented in the next sections, estimates of replaceability at three levels of confidence and for two separate categories of operation have been made for both subsystems. These estimates are summarized in the tables at the end of this document. The two categories of operations are discussed separately for each of the subsystems in the next two sections.

The three estimates of replaceability are based on an assumed level of sophistication for the new systems implied by the systems concepts discussed in this document. Generally speaking, more sophisticated (and more costly) mechanized systems would result in higher estimates of replaceability for manual tasks. Similarly, less sophisticated systems would be expected to produce smaller percentage replaceability estimates for the tasks. Considering that the replaceability estimates are based on educated guesses for the most part, the use of confidence intervals around our best guess is at least questionable. In assigning the three values, two thoughts were kept in mind. First, when the new systems are in operation, the actual value is most likely to be our best guess (expected value) and we would guess that the odds are 20 to 1 that the actual value will not be higher than our highest estimate, nor lower than our lowest estimate (a 95% confidence interval).

In studying the summary, keep in mind that a 0% replaceability means that mechanization will have no impact on the personnel time required to perform that particular task. A replaceability of 20% means that the personnel costs associated with performing a task could be reduced by 20% with the installation of mechanized procedures, or conversely, that the present work force could absorb a proportionately greater

EXAMPLE OF ASSUMED CONFIGURATION



(A) Programmable CRT Terminal with tape cassette (Datapoint 2200 @ $7000)

(B) Satellite CRT Terminal (Datapoint 3300 @ $3000)

(C) Mark-sense Card Reader (Motorola MDR 9000 @ $5000)

(D) Optical Label Reader & Output Terminal (NCR 280 Retail Syst @ $4500)

(E) Extra Light Pens for NCR 280 (@ $1000)

(F) Communications Modem - 4800 Baud (@ $6000)

(G) Line Printer - 600 lines/min (@ $5000)

(H) Disk Storage Unit - 3×10^6 Bytes (Diablo 39 @ $8000)

(I) Tape Drive (Kennedy @ $4000)

(J) Mini Computer (PDP/8 @ $10,000)

(K) Communications Network - 4800 Baud (@ $200/mo/campus)

(L) Central EDP Machine - 512 K Bytes (360/65 @ $600,000)

work load. A task which is 100% replaceable means that it would no longer be performed at all after the installation of a mechanized system. On the other hand, a negative value for percent replaceability would indicate that there would be an increase in personnel costs to perform that same task after the introduction of mechanization.

While it is true that no final hardware decisions have been made for the Program as yet, possible hardware configurations presented in the figure may help some readers visualize the operational concepts assumed for the purpose of assessing potential replaceability of manual tasks. The configurations presented are not totally hypothetical, however. Some of our earliest analyses suggested that there is likely to be an economy of scale working in favor of a large central data processing facility dedicated exclusively to servicing the needs of the libraries through the use of a communications network and intelligent, versatile terminal equipment at each of the campuses. These earlier findings are currently being re-evaluated through a careful assessment of data processing needs to meet the University-wide requirements for Order and Standard Loan with a computer simulation of potentially feasible hardware configurations. The results of the simulation studies may well require changing some of the concepts assumed for the replaceability assessment when the actual design of the new Order and Standard Loan Subsystems begins.

III. ORDER SUBSYSTEM

A number of factors have complicated the assessment of Order Subsystem task replaceability. One of the most important is the increasing use of standard order plans for various categories of acquisitions and the eminent, but yet unknown nature, of mechanized procedures which such vendors may be able to provide to the University. Another is the wide variability of organizations employed throughout UC for acquiring library materials. In an attempt to define systems which would be applicable University-wide (see Ref. 2),

major library functions were defined in such a way that they woul' be independent of both material type and organizational structure. Thus, personnel in the typical Acquisitions Department will perform work which has been defined to be a part of several Subsystems (major functional areas) excluded from the present detailed assessment. Specifically, work from the following Subsystems is often performed in such departments: Collection Development (1.0), Request (2.0), Source Selection (3.0), Bibliographic Searching (4.0), Accounting (7.0), Auxiliary Source (8.0), as well as Order (6.0).

Two major areas of order operations are defined for the purpose of assessing replaceability. The MAIN operations refer to the normal processes involved in buying most materials which are ordered from a publisher or dealer. Thus, placing orders for monographs, and setting up subscriptions or standing orders followed by the receipt of such materials, characterize the MAIN operations. Activities such as requesting and receiving free copies of publications characterize the work defined as SECONDARY operations. Thus, the Reference Department that acquires free pamphlets or the branch library that buys a few paperback books at the nearby book store would be SECONDARY operations. Mechanization will tend to have less impact on the SECONDARY operations.

It is hoped that our resource people at all of the campuses will be able to help us better define the nature of the library operations which should be designated as SECONDARY so that we may refine our assessment of the potential impact of mechanization on these operations.

In the following paragraphs the MAIN operations will be discussed first, and then, if there is a need, the SECONDARY operations will be discussed.

6.1 SURPLUS CONTROL MODULE. The major impact which mechanization will have on this module will be the reduction in the unintentional duplication rate due to the maintenance of more accurate records. Such duplications occur for the most part because slight variations in bibliographic or in-print data caused existing records of material on hand or on order to be overlooked. A mechanized system which tolerates spelling errors or variations in form of entry in searching the outstanding order file and eventually the main bibliographic file of the University will prevent a good many of the unintentional duplications, particularly overlap on approval plans. Some of the more systematic decisions and some of the correspondence may be automated, but on the whole, automation will have very little impact on the work covered by this module.

6100 SOLVE PROBLEMS. By its very unpredictable nature, the work covered by this task must continue to be performed manually. However, a reduction proportional to the reduction in the number of duplicates would be predicted.

6101 PREPARED CORRESPONDENCE. The use of decision tables and form letters prepared by machine will permit the replacement of some of the work currently performed as part of this task, in addition to reductions due to fewer duplications. Work performed in the SECONDARY operations would be somewhat less impactable due to the non-standard nature of the work.

6102 ACTS ON CORRESPONDENCE. Almost all of the work performed under this task is non-impactable. Thus, the only reductions will result from a general reduction in the rate of duplications for the MAIN and SECONDARY operations.

6301 PROCESS DUPLICATES. The new systems will probably have little or no effect on the physical handling of materials which have been unintentionally duplicated. Any labor which is replaced will result from the general reduced rate of unintentional duplication for both the MAIN and SECONDARY operations.

6.2 ORDER INITIATION MODULE. This is a highly impactable operation. Recommendations will arrive on machine-readable cards so that some of the information provided about and by the recommender as well as the results of the bibliographic pre-order searching can be automatically read at the same time as the rest of the order information is being keyed. Utilizing decision tables, the fund can be automatically assigned much of the time from the information about the recommender's subject area specialty and the LC Classification (or rough subject classification when LC is not available) of the recommended title. Much of the time the vendor can be automatically assigned utilizing the same technique and the available imprint and classification data. While automatic assignments of vendor and fund will require screening, the system will present data organized in a way which simplifies and speeds up the process. Nearly all of the record handling will be eliminated including most of the follow-up activities.

Recommender cards will be processed through a mark sense reader and the non-coded data will be keyed at a CRT terminal onto a magnetic tape cartridge. The terminal will permit a visual check for accuracy and pre-process the data to catch a good many of the format or content errors in the data. At the moment of keying, the system will generate a short

search key for the main entry and title (plus the LC card number when available) and will check in real time a file of similar keys representing all current outstanding orders. Matches or near matches will terminate the remainder of the record generation until the next day when a copy of the full record representing the outstanding order for which a match has been found is availalbe at the terminal. Based on the classification (even rough subject classification) and/or the imprint date, an estimated price will be generated automatically unless one has been provided during searching.

Two order slips will be produced for the vendor each week except for those orders marked rush which will be processed daily. One of the order slips will be returned with the material or used by the dealer to report his reasons for not sending the material. Many orders will be mailed with a blank check (not good for more than sav $15.00) to those vendors who have been determined in advance to be reputable and willing to handle payment in this way.

6200 SOLVE PROBLEMS. Because of the unpredicatble nature of work covered by this task, very little of it will be replaceable. More complete and more widely available order and process information should permit many of the problems to be solved more quickly in the MAIN operations. The SECONDARY operations are probably non-impactable.

6201 CHECK REQUESTS FOR MISSING DATA. Because the system itself will provide many checks on the validity and completeness of data, a pre-keying check will not be performed for routine purchase requests. Imperfect records will be tagged so that a supervisor may review them later at the CRT terminal in order to take any necessary corrective action on each record. Pre-sorting into ordering priority will not be necessary either as the system will perform this function from coded priority data. In the SECONDARY operations, most of the checking will continue to be performed manually so that very

little of this task will be impacted by mechanization.

6202 PROVIDE MISSING DATA ON REQUESTS. A majority of such information will be provided through the use of decision tables. Most vendor assignments will be made automatically when imprint and classification information are available. Fund assignments will generally be made automatically from recommender and subject classification information. Estimated prices will be provided automatically from imprint and classification data unless it has already been provided by the recommender or searcher. This task is highly impactable in the MAIN operations. Because a new source is typically used for each new request for free materials in the SECONDARY operations, this task will be almost completely non-impactable.

6203 PREPARE ORDER FORMS AND MAIL. The process of keying data on order forms should be significantly speeded up due to fewer interruptions for locating information required on the order form. The new system will automatically assign order numbers and display the order information on the CRT screen for faster revising. A great deal of physical handling of order forms should be eliminated with the system producing a larger batch of orders for a single vendor grouped by subject (and by campus where several campuses have elected to have orders mailed from the central data processing facility) for the vendor's convenience. Similar procedures will likely be used for both the MAIN and SECONDARY operations.

6204 PREPARE ORDER LETTERS AND MAIL. The new system will prepare a variety of form letters requesting various categories of material that is ordinarily provided free, by organizations. Thus, a significant amount of keying should be eliminated. Physical handling of requests and order letters should be greatly reduced. By using self-mailers, and bulk rate postage, the cost of handling and mailing the machine produced letters will be lower. Most of the work covered by this task will be

in the SECONDARY operations.

6205 TELEPHONE OR TWX ORDERS. This task will continue to be performed as it is now so that this task is almost totally non-impactable for the MAIN and SECONDARY operations.

6206 PREPARE PRE-ORDER CORRESPONDENCE. Nearly all of the keying and physical handling of pre-order correspondence will be eliminated by the new system. Automatic assignment of vendor and follow-up on unsuccessful requests will be performed by the machine system for the bulk of such orders. The use of self-mailers and bulk rate postage will also cut costs. This task is concerned almost exclusively with MAIN operations so that the impact on SECONDARY operations will be minimum.

6207 PROCESS LIBRARY RECORDS OF ORDERS. Nearly all record keeping and record handling functions will be performed by the machine portion of the new system. Manual back up files will be almost totally eliminated. Physical handling of the order slips will be greatly simplified and most of the routing of order information will be handled automatically. This is a highly impactable task for both the MAIN and SECONDARY operations.

6208 PROCESS ORDER CANCELLATIONS. Through the use of automatic cancellation clauses on most order slips (optional for each campus and type of order), most of the correspondance concerned with cancellations can be eliminated. A system will automatically generate special reports to those individuals concerned with the cancelled orders. The system also will generate cancellation letters automatically where this is required with information presented in advance to an Acquisitions Librarian for possible exception action. This is a highly impactable task for both the MAIN and SECONDARY operations.

6209 PROCESS CEASED PUBLICATIONS. The new system will handle most of the record maintenance functions automatically

and will prepare exception reports for those concerned with the ceased publications automatically. There will still be a significant amount of personnel time involved in dealing with the exceptional situations in connection with the ceased publications, especially in the SECONDARY operations.

6210 PROCESS DEALER REPORTS. Most dealer reports will be submitted on the machine readable order slip sent to the dealer as a turnaround document. These reports will be machine read with minimum human handling and the necessary subsequent follow-up action will be taken by the system automatically. Where dealer reports are received by letter, the information will be transcribed to a machine readable (mark sense) dealer report which will then be machine read into the system in the usual way.

Because of the exceptional nature of handling dealer reports in the SECONDARY operations, the impactability here will be relatively low.

6.3 CLAIMS PROCESSING MODULE. Mechanization will have a great impact on the work carried out under this module. Information about claiming actions about to be taken by the system will be presented to the Library Assistant responsible for handling claims so that exceptional situations may be further investigated prior to authorizing the system to proceed with the automatic generation of a claim. Exception action will include adding notes of explanation to the claiming letter generated by the system. All follow-up will be initiated automatically by the system including the preparation of self-mailer claims for the majority of claims. By batching the majority of claims for weekly mailing, bulk rate postage can be used for further savings. Checking in the claimed materials will be expedited by using machine readable claim slips returned with material to be immediately machine read on receipt. Vendor performance records generated from University-wide data will increase the chances that the appropriate claiming action is taken

for each piece of missing material. The physical handling of claimed material will be slightly expedited through the availability of better records.

6300 SOLVE PROBLEMS. Because of its unpredictable nature, this task is almost completely non-impactable for both the MAIN and SECONDARY operations.

6301 SEARCH FILES FOR NEEDED ACTION. Because the system will automatically search files for needed claiming actions, this task is almost totally replaceable for the MAIN operations.

It will be slightly less impactable for the SECONDARY operations, but even here, most of the follow-up action will be initiated automatically by the system.

6302 PREPARE NON-SERIALS CLAIMS. The preparation of claims for nearly all non-serial orders will be handled automatically by the system. Weekly batches of claim notices will be prepared using self-mailers with addresses pre-sorted by zip code so that bulk rates may be used. Claim preparation will be similar for both MAIN and SECONDARY operations.

6303 PREPARE SERIALS CLAIMS. The new system's claiming action for issues of serials will be the same as for non-serials, with the exception that claiming delay will be based upon expected date of arrival for each issue.

6304 TELEPHONE OR TWX URGENT CLAIMS. This task will continue to be performed much as it is now under existing manual systems. The existence of better records should reduce claiming delay and speed up the process of placing such claims for both the MAIN and SECONDARY operations.

6305 HANDLE AND PROCESS MATERIAL. A machine readable claim slip returned by the vendor with the claimed material

will be coded by the receiving LA to indicate the nature of further action to be taken and these slips will then be immediately machine read to indicate the status of the claimed material in the receiving record for the serial. The physical handling of the material will continue without much change from the existing manual activities in both the MAIN and SECONDARY operations.

6306 CLAIM MISSING INVOICE. After a predetermined delay, the system will generate a display at the CRT terminal indicating that an invoice claiming action will be initiated for material received some time ago. The invoice processing Library Assistant may stop the action and request more information the next day, if there appears to be anything unusual about the order. This is a highly impactable task.

6307 PROCESS RESPONSES TO CLAIMS. The machine readable claims slip sent to the vendor will contain spaces for him to code the nature of his response when it is other than providing the claimed material. A significant portion of the dealers reports will arrive on these machine readable turnaround documents. Many other responses received in letters can be so coded for immediate machine input. Predetermined responses, including reordering the missing material from the same or an alternate vendor or placing the missing issue on a want list, will be taken automatically by the system for a sizeable portion of such unsuccessful claims. Becuase the system will "always have time and never forget" to prepare claims, the number of claiming actions probably will increase greatly at most libraries. Correspondence handling in connection with unsuccessful claims will increase due to such automatic processing of claims notices and probably more so for the SECONDARY operations.

6.4 RECEIVING MODULE. The vendor will be instructed to return a copy of the machine readable order slip with each item ordered as is typically done now at most libraries and this will speed the process of verifying that the received

material is actually that which was ordered. Where the machine readable slip has been returned with the material, recording receipt of the material will consist of immediately machine reading the slip. Because the receipt of each title is recorded separately, the receiving assistant need not be concerned about identifying partial shipments - the system will discover this situation automatically and take appropriate action. The returned order slip will then be attached to any available invoice and routed on to facilitate the recording of invoice information.

The next previously prepared form containing three identical machine readable labels will be assigned to the bound volume or serials issue just received. One of the labels will be immediately affixed to the inside back cover for the bound volume or the cover of the serials issue. The Piece Identification Number (PIN) contained on the label will then be read by wiping the light pen across the label and this will complete the receiving process for the item. If the receiving clerk fails to record both the Piece Identification Number (PIN) and the order number (from the order slip or in the case of a serials issue from the number contained on the mailing label) the system will produce an audible signal reminding him that the transaction has not been completed. The machine readable label containing the (PIN) will follow each piece of library material through the entire processing cycle and ultimately will become the machine readable Book Identification Number (BIN) required by the Standard Loan Subsystem. One of the two remaining labels will become the spine label for bound materials.

Where the order number has not been included on the mailing label of a serials issue just received, the receiving clerk will consult the public listing of serials data to obtain the number assigned to that particular serial title. This number will then be keyed at the CRT terminal and the light pen will be wiped across the machine readable label just affixed to the cover.

The system will display the next expected issue of the serial and if the item received matches this, the receiving transaction will be complete. If it does not match the receiving clerk will key an identification of the received material at the CRT terminal and the system will make the appropriate record changes that evening during the regular batch run.

Where individually ordered material is received without a copy of the machine readable order slip which was supposed to be returned with the material, the apparent author and title (and LC card number, if available) will be keyed at the CRT terminal. The system will generate a search key automatically in real time and will compare this key against the file of keys representing the outstanding orders. If a unique match is found, the system will instruct the receiving clerk to send the material on to the next processing station. If no match is found, the system will instruct the receiving clerk to shelve the material temporarily until the next day when further instructions will be provided automatically by the system. Whenever there is a special circumstance surrounding the receipt of a particular piece of material, information about the special circumstances will be added to the receiving record by keying the appropriate codes at the CRT terminal. For items which have apparently been received without orders, the system will prepare an input for batch processing that evening, which will trigger a search for the full outstanding order record maintained at the central Library Data Processing Center (LDPC). The results of this search will produce the list of possible orders that might represent the received material. The same exception reporting procedure will be used where there is more than one item which carries the same search key in the on-line outstanding order file.

When no outstanding order record can be found for an item received from a vendor in the active vendor file, a letter of inquiry will be prepared by the system automatically requesting information about the library's original order. At

the same time, the system will gather together all of the information available about the particular order and will display it the next day for the Library Assistant's review, in time to stop the automatic generation of the vendor query. After a pre-determined delay, the material will be assumed to be a gift and processing will proceed as usual for gifts.

Material known to be gifts or material received on standing order approval plans and the like will follow a receiving procedure partially determined by the nature of the records provided by the vendor. Where no record or only a human readable record accompanies the material, receiving will involve the added step of keyboarding a minimum amount of bibliographic and imprint (or donor) data supplied by the vendor. Where the material has been received from a vendor which provides machine readable information about each title he has sent the library, this data will be read into a file and will be batch processed that night to present it the next day in a form which will expedite the recording of receiving data. With such data available from the vendor, recording receipt will consist of comparing the book against the information displayed on the screen of the CRT terminal and keying a code indicating the acceptability or unacceptability of each title.

Affixing the machine readable label to the inside back cover and wiping the light pen across it will complete the process as with material which was specifically ordered.

When library material is received in damaged condition, this fact will be keyed at the CRT terminal and the system will determine and display to the clerk in real time what action is to be taken. The system will consult a decision table for frequently used vendors and will specify that material from other vendors be held until the results of a batch run that night establishes the recommended disposition for the damaged material.

6401 UNPACK AND ARRANGE MATERIALS. The inclusion of shipping labels with orders sent to vendors should speed the process of sorting out library materials from the incoming mail; mechanization is not likely to have much impact on this task in either the MAIN or SECONDARY operations.

6402 CHECK MATERIAL AND RECORD RECEIPT. This is a highly replaceable task in the MAIN operations with the mechanized portion of the system handling most of the work other than the physical handling.

The SECONDARY operations may be moderately impacted where orders were placed with a machine readable order slip.

6403 PREPARE MATERIAL FOR NEXT PROCESS. The requirement for preparing a Process Information Card will be an added step. The other activities covered by this task would be almost completely unaffected by the introduction of a mechanized system so that one would expect the time spent on this task to increase after the new system is installed. These statements hold true for both the MAIN and SECONDARY operations

6404 RELOCATE ORDER RECORDS. This task is almost totally impactable. A weekly listing of the in-process file will show the current status of material which is not yet represented in the library's main public catalog. Patron notifications of received material will be generated automatically on self-mailing forms. Arrangements will be made with major approval

dealers to provide bibliographic information about each book shipped to the library in a machine readable form so that the time required to handle approvals forms is minimized.

On the assumption that a significant portion of orders in the SECONDARY operations can be processed by the new mechanized system, a significant level of impactability would be predicted here, too.

6405 MAKE NEW RECEIVING RECORDS. This task is totally replaced by the mechanized procedures. The system will automatically maintain its receiving records so that it will never be necessary to make additional records for recording receipts which will no longer fit on an existing record.

A very small volume of activity will be predicted for SECONDARY operations so that it is unlikely that new mechanized systems would have much of an impact on these activities.

6.5 INVOICE PROCESSING MODULE. This module will be designed so that the information as it appears on the invoice may be keyed directly without any special calculations or conversions. The system will provide a very versatile input format so that all but the most exceptional invoices can be keyed at the CRT terminal without modification. If the invoice has one or more machine readable order slips attached to it when it arrives, these slips will be read one at a time and the related invoice data keyed after each one. If one or more of the order slips are missing because some or all of the material has not yet arrived, the available information on the invoice will be keyed into the system which will then instruct the operator to record a unique transaction number on the invoice and to file the invoice by a transaction number until the system issues further instructions regarding that invoice. The invoice data will be submitted in a batch run that evening where an attempt to locate the outstanding order records will

be made. If the search is unsuccessful, the system will gather together all available information on the order and present it for review by the invoice processing assistant the next day. If a decision still cannot be made, the system will automatically prepare a letter requesting additional information regarding the invoice addressed to the vendor using a self-mailing device. If the system located outstanding order records which indicate that all of the invoiced material was received and accepted, the system will automatically prepare the necessary machine readable inputs to the University accounting system and will prepare à message for the person processing invoices the next day, indicating that the invoice may now be filed in the history file for eventual audit. If the outstanding order records which are found indicate that the material has not yet arrived, the outstanding order records will be tagged indicating that the invoice has arrived and invoice data will be placed in a machine file for subsequent follow-up as required. The system will perform all necessary calculations on the invoice including the distribution of tax or shipping charges and discounts among several titles on a single invoice. If the currency on the invoice is other than U.S. dollars, the system will automatically make the necessary currency conversions. Every time the system authorizes an invoice for payment, it will present the invoiced data in a uniformly formatted display at the CRT terminal for post-audit by a responsible acquisitions librarian. Acceptable invoice records will be so designated and removed to a history file while questionable invoices will be flagged for possible exception action by the acquisitions librarian.

Credit memos from vendors will be assigned a unique transaction number by the system and the credit information will be maintained in the machine invoice file until the opportunity arises for redeeming the credit. At this point, the system will generate an instruction to the person responsible for processing invoices and will request that the credit memo be retrieved and transmitted to the University accounting

Office with a note indicating the invoice number against which it is to be applied.

Request for pre-payment on orders will be handled like the receipt of an ordinary invoice which is given a transaction number and filed in active invoice files until the receipt of acceptable material.

Government coupons will be handled very much like credit memos are handled with the exception that special reminders will be displayed on the CRT terminal when additional coupons should be ordered.

For a significant portion of orders placed to vendors known to be reputable, the entire invoice process will be circumvented by sending a blank check with the order for each item. The check will be made out to the specific vendor for a specific title and carry a dollar limitation. If the vendor sends an invoice indicating that he has cashed checks for the amount invoiced, this fact together with the order numbers will be keyed into the system. The invoice will be given a transaction number and filed in the outstanding invoices file, and the outstanding order records will be flagged to indicate that cancelled checks for the orders should be expected in the near future. When the cancelled checks arrive, the order number will be machine read from the check and the amount on the check will be keyed at the CRT terminal. The outstanding order records will be flagged to indicate that payment has been made and the check information will be transferred to a file for review by the Acquisitions Librarian before being finally transferred into a history file.

6500 SOLVE PROBLEMS. Many vendors will find the library's automated procedures to be somewhat inflexible and this situation may result in an increased number of invoice processing problems. Thus, the cost of performing this task is likely to increase after the mechanized systems are installed, the increased costs are likely to be greater for the MAIN operations than for the SECONDARY operations. The reduction in the number of invoices processed may offset this increased cost

partially and the availability of better information about vendors and orders should permit invoice problems to be handled more quickly.

6501 PREPARE INVOICE FOR PROCESSING. The handling of invoices will be significantly simplified and there will be almost no separate record keeping involved with the new system. Because all invoices for library materials will be processed through the mechanized system, the impactibility of this task is approximately the same for both MAIN and SECONDARY operations.

6502 RECONCILE INVOICE WITH SHIPMENT. Most of the reconciliation of information contained on the invoice with material received will be handled automatically by the system. The system will be told that the received material matches that which was ordered during the receiving operation and the automatic invoice processing routine will verify that all invoiced items have been received and that the invoiced amounts do not deviate significantly from the encumbered amounts. The reconciliation procedure will apply to cancelled checks (check with order) as well as to invoices. The system will flag the exceptions and these will continue to require individual attention from the processing personnel. MAIN and SECONDARY operations should be equally impactable.

6503 PROCESS INVOICE FOR PAYMENT. This task is almost totally impactable by mechanization. Only the review of paid invoices during post-auditing, to verify the acceptability of the invoice, will involve personnel time and the time involved to perform this task will be greatly shortened by uniformly formatting the invoiced data and presenting larger well-organized batches of invoices for review at one time. Both MAIN and SECONDARY operations will be equally impacted.

6504 PREPARE INVOICE FOR ACCOUNTING. All activities involved in preparing the invoice for accounting will be

eliminated and will be replaced by machine procedures which will prepare data for accounting in a machine readable form required by the University accounting system. This task will be almost totally replaced in both MAIN and SECONDARY operations.

6505 FILE COPY OF INVOICE. By filing invoices in transaction number order for possible future office audit, the process will be slightly simplified for both MAIN and SECONDARY operations.

6506 OBTAIN AND USE CREDIT MEMOS. The majority of credit memo requests will be prepared automatically by the system in conjunction with the automatic preparation of correspondence regarding return of material. A credit memo from an obscure supplier which has not be determined previously to be reputable will be flagged and displayed to invoice processing personnel the next day for possible exception action. The system will maintain records of the availability of credits and will automatically indicate when such credits are to be applied against invoices which have been received. The system will inform invoice processing personnel when credit memos are to be submitted to the University Accounting Department to be applied against a specific invoice. Credit memo filing is a relatively insignificant task. This is a highly impactable activity for both the MAIN and SECONDARY operations.

6508 ORDER GOVERNMENT COUPONS. The system will provide some help in keeping track of when coupons should be reordered, but on the whole, this is not a very impactable task.

6509 PROCESS OTHER PAYMENT FORMS. By establishing simpler procedures with University Accourting for pre-payment requests, some reduction in the cost of performing this task may be obtained. The receipt of a vendor's statement will entail keying a minimum amount of information about the vendor and the orders to permit the system to ascertain whether or

not the appropriate invoices have previously been paid. After the keying, the system will instruct the invoice processing personnel to note a unique transaction number on the statement which is then to be filed in an outstanding invoice file until further instructions are received from the system. During the regular nightly run, the system will check on the status of orders covered by any statement and indicate what action is to be taken on a statement. In some cases the statement may be treated like an invoice, if none has arrived and adequate information is included on the statement. However, in other cases the system may automatically generate a query to the vendor requesting additional information about the missing invoice or the orders which are covered by the statement. A significant amount of exception action probably should be anticipated in connection with dealing with statements. This will be a moderately impactable task in both the MAIN and SECONDARY operations.

6.6 VENDOR FILE MAINTENANCE MODULE. On the order of 3000 to 5000 vendors are used by each of the libraries in the University of California. By creating a single University-wide file of vendor information and maintaining such a file collectively, more extensive and comprehensive information about vendors can be made available to each of the libraries of the University. Erroneous information corrected by any Order or Acquisitions Librarian would be available to others in the system. By maintaining such a file centrally, a significant amount of the file maintenance activities currently duplicated by the campuses would be eliminated. The most recent version of the file could be printed out for reference by order processing personnel at the campuses several times a year, if that were determined to be desirable. All tasks in this module are highly impactable.

6600 SOLVE PROBLEMS. By sharing the file maintenance responsibilities among all of the campuses, the number of problems which will need to be solved by the campus should be

significantly reduced.

A significant number of the vendors used in the SECONDARY operations will not be contained in the vendor file so that this task will be less impactable for these operations.

6601 MAINTAIN AND USE FILE. The machine manipulation of vendor records and the processing of records once, for use by all nine campuses, should significantly reduce the costs associated with performing this task for the MAIN operations.

The SECONDARY operations will be significantly less impacted because many vendors used by these operations will not be contained in the central vendor file.

6.7 WANT LIST PROCESSING MODULE. Requests for out-of-print material will, to a large extent, parallel the processing of requests for in-print material. Thus, titles authorized for purchase will be keyed into the system like an ordinary order with the exception that purchasing priority designations and flags to indicate that the title is out-of-print are included in the record. As with in-print orders, the system will automatically assign a vendor from information contained in the record and when a sufficient number have been accumulated for a single vendor, will generate order slips as with regular orders.

The Acquisitions Librarian will be able to control the value of want list items out to vendors by setting a priority level below which no orders will be placed and by stopping requests for materials within designated classification ranges.

The system will prepare a variety of reports for review by the Acquisitions Librarian indicating the characteristics of items currently on the various want lists and presenting the detailed order information for review on demand.

Utilizing historical data, the system will predict the cost of out-of-print materials which are likely to be received from vendors who have received want lists within a specified period of time. Orders for out-of-print titles may or may not

carry the designation "please search". Dealers will be instructed to use the order slips as report forms where the library has specifically indicated that they do not wish the dealer to "search". All order forms will carry the note that orders are automatically cancelled after a specified period (eg. 6 months) of inaction. The system will automatically follow up on orders for which there has been no activity and will automatically reassign the title to another out-of-print dealer. At the option of each library, titles may be combined to produce union want lists by subject for the entire University to be sent simultaneously to all appropriate search dealers.

6700 SOLVE PROBLEMS. The mechanized system will probably provide very little help in solving problems connected with obtaining out-of-print materials. The unusual and unexpected nature of the majority of problems connected with want list processing precludes the establishment of predetermined responses to such situations. If anything, the number of problems may increase due to such procedures as automatic cancellation of orders with reassignment to second vendors, etc. This applies to both MAIN and SECONDARY operations.

6701 SORT AND FILE OP REQUESTS. All sorting and filing activities will be handled automatically by the system so that this task is totally replaced by the mechanized procedure for both MAIN and SECONDARY operations.

6702 DECIDE WHEN AND WHERE TO MAIL. The system will provide a great deal of information to Acquisitions Librarians which will aid them in deciding which requests should be placed on want lists and when want lists should be submitted to dealers. The initial assignment of OP dealers can be handled automatically for a majority of the titles from information contained in the order record and decision criteria established by the Acquisitions Librarians.

This is a moderately impactable task in the SECONDARY operation for those materials which pass through the MAIN processing routines.

6703 SEND OUT OP WANT LISTS. The system will automatically prepare the order slips for items contained on want lists in batches organized by vendor and by zip code to speed up the mailing process.

It is assumed that want lists prepared in the SECONDARY operations would utilize the MAIN procedures.

6704 FILE COPIES OF OP WANT LISTS. This task will be totally replaced by the mechanized systems in both the MAIN and SECONDARY operations. Want lists as such will not be filed, but the outstanding order records will contain information which will permit such lists to be assembled on demand.

6705 FOLLOW-UP AND RE-ISSUE LISTS. Every order record will contain a follow-up date including records of want list items. Once a want list title has been issued to an out-of-print dealer, the process of reissuing it to second and third dealers will proceed automatically utilizing decision criteria established by the Acquisitions Librarians. The Acquisitions Librarians may call for a list of all titles which have been submitted to one, two, or three dealers at any time for review. After the third dealer has been unsuccessful in locating the wanted title, the system will automatically include that title on a list of titles requiring special attention by the Acquisitions Librarian. Thus, for a significant number of titles on the want lists, this task will be performed automatically and is, therefore, highly impactable.

This task will be moderately impactable in the SECONDARY operations assuming that the majority of the out-of-print material required by these operations can be processed by the MAIN procedures.

6706 PROCESS DEALERS REPORTS. Nearly all dealer reports for want list items will be submitted on the machine readable order slip sent to the dealer as a turnaround document. Dealer reports will be mark sense coded to indicate the nature of the response from the dealer and these will then be immediately machine read. The systems will automatically take the necessary follow-up action including presenting the response with all other related records to the operator the next day for exception action, the generation of an order, the reassignment of the title to another out-of-print dealer, or the preparation of a form letter explaining that the quoted price is too high.

For a portion of the OP orders placed by SECONDARY operations, the same procedures will apply.

6706 SEARCH CATALOGS FOR WANTS. This process can be speeded up by instructing the system to prepare classified and alphabetized lists of want list items in a form most convenient for comparing with the items listed in dealers catalogs.

In the SECONDARY operations, not all of the want list items will have outstanding order records in the machine to be manipulated in this way.

IV. STANDARD LOAN SUBSYSTEM

The concepts discussed here were first presented by Bob Foulkes in Reference 3 in accordance with the systems definitions presented in Reference 2. In discussing requirements for a circulation system with a large number of people, it is now clear that several of the functions which must be performed by such a system should desirably be performed in an on-line interactive mode. It is generally agreed that some improvement in the overall quality of library service must accompany the installation of a new mechanized circulation system - that cost minimization must not be used exclusively in justifying a new system. Thus, most features which would reduce costs at the expense of effectiveness must be ruled out from the beginning.

The distinction between MAIN and SECONDARY operations is based on at least two considerations. First, small volume circulation points may not justify the installation of expensive equipment. Second, collections of some library materials are not classified or indexed to permit the use of short codes (such as call numbers) necessary for keeping files of a manageable size. Examples of such collections might include Government Publications, Manuscripts, Cartographic Materials, and others where the library feels that it cannot consistently describe such materials within a relatively small number of characters (say 30). Operations where it is not desirable to apply the circulation procedures developed for the MAIN circulation operations of the libraries are designated as SECONDARY operations. This does not mean that they cannot be mechanized, only that it appears at this time to be undesirable or uneconomical to do so.

MAIN operations are those which handle the bulk of the books circulated by the libraries and those where the same procedures can be applied even though they have small circulation volumes or deal with unusual forms of materials. Thus, any organization such as a branch library or serials department which circulates a relatively large number of classified items would be considered a MAIN operation. Departments with low circulation volumes, but classified materials, might interface

with the MAIN operation system by utilizing one of the manual backup procedures provided for these operations.

11.1 BOOK CHARGING MODULE. The concepts reported here probably are the most elegant of the various alternatives presented in HAS 70-3, prepared by Bob Foulkes. The concept revolves around the use of a machine readable label and equipment developed for inventory control and point-of-sale transaction recording. A machine readable label approximately one inch wide by two inches long is affixed to the spine of the book as well as to the back of the borrowers existing identification card. The patron presents the book which he wishes to borrow and his ID card to the clerk at the Circulation Desk who wipes the light pen attached to the circulation terminal first across the machine readable label on the back of the patrons ID card and then across the machine readable label on the spine of the book.

The data thus recorded is transmitted to a central campus location where it is checked against two relatively short files of numbers representing patrons whom the library would like to contact prior to loaning them additional materials and books which the library , for any of a number of reasons, does not want to be charged in the normal way. If either the patrons ID number or book ID number is found in these files, the system will return a signal back to the transaction terminal indicating that the clerk should obtain further information before completing the charging transaction. At a location where it has been possible to justify the installation of a CRT display terminal, the clerk will be able to key the two identification numbers and receive a message on the screen of the CRT immediately indicating the nature of the exception action which should be taken. Where a CRT terminal is not available, the clerk will telephone a central location and ask that the staff member on duty there query the file and report the results by telephone while he waits. Thus, "bad guys" and lost books for which there are "holds" can be caught in time to take the necessary remedial action.

Where a patron has forgotten his ID card, the clerk may check a printed patron registry (either directly or by phone) and key the patrons ID number using the keyboard on the circulation terminal. Where the book has not been previously prepared for automatic charging, by machine, the clerk will take the next previously prepared set of labels, peel one of the self-adhesive labels off and affix it to the spine of the book. He will then peel a second label off and affix it to the inside back cover of the book and will record by hand in the space provided on the sheet of paper which originally contained three individual labels, the full call number plus the first ten characters of the apparent main entry. The call number will be carefully checked by a second person (perhaps the patron) before the charging transaction is completed.

The identification numbers assigned to both patrons and books will contain a check digit which will permit the system to detect single or multiple errors made in keying either of these two numbers during manual key entry into the system.

A patron who does not yet have a library identification number will be given the option of selecting one of his own permanent plastic identification cards or will be given a plastic library identification card and a previously prepared machine readable label will be affixed to the back of the selected plastic card. Next to the second label on the sheet of paper originally containing the two, the patron will be asked to record his name, status, and social security number.

The forms containing the remaining labels together with either the book identification or the patron identification information will be sent to the central library location where as time permits, the machine readable labels will be read by light pen and the remaining information keyboarded at the CRT terminal. As time permits, a second person will visually check the keyboarded information against that which was recorded on the original forms using the CRT display. The original records will be saved one week and then destroyed.

Telephone renewals will be handled by keying the patron's ID number and the book ID number into the system and the process will continue like an ordinary charging transaction. Where the patron presents the book itself for renewal, the procedure will be exactly like an ordinary charging transaction. In checking the book ID number against the small file of books which should be treated in some exceptional way, the system will detect books which should not be renewed and will signal the clerk in the usual way that some exceptional action is to be taken.

Two forms of back-up capability will be provided. With the first method, patrons will be asked to write their ID number along with the ID numbers for each of the books they wish to borrow on a special form prepared for that purpose. Charge clerks will be instructed to very carefully check the handwritten numbers to make sure that they match the ID numbers on the patron's card and on the books he wishes to borrow. When the system is again operational, the clerk will simply keyboard the numbers as she would if she were taking a telephone renewal. The system will automatically catch single and most multiple erroneously keyed numbers. In the manual back-up mode, the circulation clerk will be instructed to manually prepare a date due slip (which also doubles as a door pass) containing the date due and the book identification number prepared using the current library color coding for security.

A second back-up mode can be employed when the circulation transaction terminal is used in conjunction with a programable CRT display terminal at the remote circulation point. Such a combination of devices will permit the charging transactions to be recorded on a magnetic tape casette which is an integral part of the CRT terminal. No on-line ID number checking will take place, but aside from that, all other aspects of the charging operation may proceed as when the total system is fully operational. Manually keyboarded ID numbers will be automatically checked for keyboarding errors and the circulation terminal will automatically prepare an appropriately coded date due slip for each book. When the central campus

unit is again operational, the charging transactions recorded on the tape casette may then be played back to the central unit where each transaction will be processed as it would have been during an on-line charging operation. Signals indicating the presence of an exception situation will be displayed at the charging terminal and the nature of the exception action to be taken will be displayed on the CRT screen for any possible actions which might be appropriate given that both the book and patron are no longer present.

At the end of the day, the new charge records, new book ID records, new patron ID records, hold, recall, missing books, will be transmitted to the UC Libraries central data processing facility at a remote location where all file maintenance functions will be performed against centrally maintained circulation files including transferring records for discharged materials to history files; preparation of overdue notices; generation of on-line files of call number to book ID numbers added since the last printed listing and Patron ID numbers for borrowers qualified since the last printing of the Patron Registry (to be sent back to the campus); the generation of exception files of book identification numbers for delinquent or abusive patrons or patrons for whom the library is currently holding requested material; and a new current circulation file organized by book identification number. Periodically on demand, the central facility will prepare an updated version of the call number -- book identification number cross reference listing file and will transmit this back to the campus for printing. Similarly, the overdue notices and bills file will be transmitted back to the campus for printing to speed up the process of getting the information back into the hands of the patron. The updated circulation file will be transmitted back to the campus (transmission of the largest campuses circulation file will require several hours - but then, we have all night) where it will be written onto a magnetic disk so that it may be queried on-line during the next day.

The system will be designed so that any campus could operate with degraded performance for several days without a batch processing run against its various files. Thus, back-up is an inherent feature of the design for the central data processing facility. Where problems of longer duration are anticipated at the central data processing facility, a second similar facility will be identified and the necessary arrangements will be made in advance to permit the batch processing runs to be shifted to the second back-up facility.

An important feature of the system is its ability to handle the circulation of individual issues of periodicals. During the process of checking each issue of the periodical into the library, a machine readable label will have been affixed to the cover of the issue and will have been made a part of the temporary receiving record for that issue. Thus, issues of periodicals which are permitted to circulate are charged in exactly the same manner as ordinary bound volumes.

1110 SOLVE PROBLEMS. Most of the problems associated with charging books to patrons will not be affected by the installation of the mechanized system. More reliable and complete records of charging transactions and some automatic checking of materials on which special charging conditions have been placed should minimize some of the problems. While some problems will be eliminated, new problems will be created by the mechanized system. Patron ID cards will be lost from time to time, and it will be necessary to re-establish eligibility to have library privileges. Because every patron and book ID number will be checked to identify exception conditions, this can be expected to require additional time on the part of the circulation attendant. These comments apply equally well to both MAIN and SECONDARY operations.

1111 CHARGE BOOK TO PATRON. Because the charging transaction will be reduced to a simple clerical process requiring almost no special training on the part of the circulation attendant and because the process will be very fast compared with procedures now widely employed by the University libraries, a significant amount of personnel time will be saved. At those circulation desks which typically require several attendants, the savings will be most dramatic. The process of wiping the light pen across two machine readable labels will be very swift. Not explicitly considered in this replaceability analysis, but nevertheless a significant intangible cost benefit, is the total elimination of all patron involvement in the charging transaction.

Some of the SECONDARY operations may utilize the completely manual back-up procedure for the mechanized system as its primary circulation procedure. Some savings of personnel time can be anticipated here, also.

1112 PROCESS CHARGE DOCUMENTS. This is a nearly totally replaceable task. The machine portion of the system will handle all of the record handling functions with the exception of input. Sorting, filing, file reading, file

searching, file purging, and all miscellaneous file handling activities will be completely eliminated. This also applies to those SECONDARY operations which are able to use the MAIN circulation system.

1113 RENEWS BOOK CHARGES. Most book renewals are handled exactly as the original charging transaction. Telephone renewals will require keyboarding the data while the patron waits on the telephone. All file checking (for holds, etc.) will be handled automatically by the system. Thus, this is a highly impactable task.

Renewals for many SECONDARY operations can be handled by telephone -- either the patron himself calling in or the circulation attendant in the SECONDARY operation telephoning a location which has access to a CRT key entry terminal.

1114 WAITING AT CIRCULATION DESK. Circulation attendants at the main circulation desks will have access to the CRT data entry terminals. During much of the time while they are waiting to serve patrons they may be keyboarding circulation transactions received from the secondary operations, information about books just processed for automatic circulation, and information about newly qualified patrons. By utilizing a signaling system (like that used by grocery clerks) a circulation attendant may call for additional help when more than 3 patrons are waiting to be served.

Because the SECONDARY operations will often tend to be smaller organizations, it will be possible less often to reduce the personnel required just to keep a circulation point open.

1115 COLLATES SPECIAL MATERIAL. By utilizing specially coded book labels, the system will be able to identify all materials requiring collation prior to being charged for use by a patron. Because the system will catch more books that need to be checked over before letting them leave with the patron, the time consumed by this task will likely increase with the mechanized system. The SECONDARY operations will probably not change their mode of operation much with the installation of the new mechanized system.

11.2 BOOK DISCHARGING MODULE. Much of the discharging operation will proceed pretty much as it does now under the existing manual systems throughout the University. Much of the physical handling of the materials will remain unchanged. Book drops will still need to be unloaded, but there will be no need for pre-sorting the books into rough call number order to match them up with charge records. Instead, books loaded onto book trucks in whatever order is most convenient for shelvers, will be taken to an available circulation terminal which will be set to record discharge transactions and the light pen will be wiped across each of the machine readable spine labels in turn. The system will check each book identification number against a small file of book identification numbers representing exception situations in real time. Whenever someone has asked the library to hold a particular book for them or whenever a book is returned overdue, the system will audibly signal the existence of an exception situation and display the nature of the action to be taken by the circulation attendant on the screen of the CRT display terminal. Ordinary discharge transactions will be accumulated for batch processing that evening. The file of discharge records will be maintained on-line during the remainder of the day so that they can be searched, if the need arises to answer a patron's question regarding the location of a book not apparently on the shelf. Recalled books and returned books requested by other patrons will be removed from the book truck and held at the Criculation Desk until the patron calls for them.

That night the discharge records will be transmitted to the Central Data Processing Facility for updating the Master Circulation File for the campus. During the batch processing run, books returned overdue will be identified and at the option of the library, overdue fines will be levied against the patron and bills will be printed using self-mailing forms batch printed with other correspondence sorted into zip code order so that bulk postage rates may be used. For those campuses which choose to abandon the

fine system, notices informing the patron that he has returned material after the date which it was due and has, thus, jeapoardized his borrowing privileges may be printed (at the option of each library)using the same self-mailer forms. The system will also prepare special printing information to be sent back to the campus where notification that requested material is now available can be printed for mailing the moment the requested material arrives back in the library.

During the discharging of material on which "holds" have been placed the circulation terminal will prepare a slip of paper containing the patrons identification number and the identification number of the book which he has requested. These slips may be posted immediately on a bulletin board provided for that purpose so that patrons anxious to obtain books they have requested may check the bulletin board as often as they wish. The Central Data Processing facility will prepare a report for printing at the campus listing in an easy to read format the names of the patrons for which material is being held. Thus, each morning slips posted the day before may be removed to make room for the new slips generated during that day.

During the check of book identification numbers which is an integral part of the discharge process, books requiring collation will be identified and an audible signal indicating the need for some exception action will be presented to the discharging Library Assistant who will then check the message presented on the CRT screen indicating the nature of the exception action he is to take.

Where the machine-readable label was affixed to the spine of the book at the time of charging, it may be necessary to more permanently attach it to the book when it is returned to the library by the application of heat and a protective coating over the label.

1120 SOLVE PROBLEMS. Misplaced charge records will be a thing of the past. Books which were not charged out properly will continue to appear in the book drops, no doubt, but the discharging operation will continue without interruption except where the book has been reported lost. By utilizing two identical machine-readable book identification labels (one on the spine and the other on the inside back cover) the problems associated with correctly identifying returned material should be minimum. In fact, because the entire discharge process will be considerably more routine the number of unpredictable problems should drop significantly in the MAIN operations and in those SECONDARY operations which are able to use any of the main circulation procedures.

1121 UNLOAD BOOKDROPS. By eliminating the need for any presorting in connection with discharging materials returned to the library and by permitting the materials to be discharged at any location where there is a circulation terminal so that returned materials do not need to be taken physically to the location of the central circulation file for discharging, it will be possible to speed up the process of unloading book drops and getting the materials to the point where they are to be discharged. This applies to all materials handled by the MAIN as well as those SECONDARY operations which use some part of the MAIN circulation procedures.

1122 DISCHARGE BOOKS. This is a highly impactable task. All of the file searching and the matching and comparing of charge cards with returned materials will be eliminated. Except for dealing with the exception messages presented to the circulation attendant the entire discharge process will proceed in a most routine and rapid fashion.

1123 PROCESS DISCHARGE RECORDS. This is a total replacable task and will be completely performed automatically by the new mechanized system.

1124 PROCESS BOOKS FOR REPAIR. The time spent on this task could increase after the installation of the new mechanized system. Requests to send specific titles to be repaired or relabeled or rebound can be submitted by anyone involved with technical processing for the library and the system will automatically catch these during the discharge operation. Thus, the number of such requests might be expected to increase somewhat.

1125 CHECK BOOKS FOR HOLDS. This is a highly impactable task. The check for holds will be made automatically by the system at the time of discharging. Handling and posting of notices to patrons that materials are being held for them will be a new task requiring some additional time.

1126 PREPARE BOOKS FOR SHELVING. Because there will be no need to temporarily shelve books in any special order for discharging and then later to restack them on book carts for transportation to the reshelving sorting area some time will be saved on this task. Similarily, because the nearest circulation terminal may be used some reduction in the transportation time may be possible.

Excluded from this assesment of replacability is any added cost associated with recording in-library use of materials. Because the process of machine reading the spine labels will be so simple, some libraries may want to add this procedure to their operations and the added handling of such materials will most certainly represent a new cost to the library.

1127 COLLATE SPECIAL MATERIAL. The collation of special material to insure that all loose pieces have been returned in good shape will probably consume more time after the installation of the new mechanized system, because the system will remind the Library Assistant discharging the material of the need for collating items determined in advance to require this step.

11.3 HOLDS & RECALL PROCESSING MODULE. This module is concerned primarily with patrons who have asked the library to locate materials which they could not find on the shelves. A search of the circulation files may be initiated in any one of a number of ways. The patron may appear at a circulation desk and announce that he has been unable to find the material he wants or he may himself or with assistance of a library staff member, dial a single number designated as the circulation information number and request status information on material which he cannot find. A circulation attendant will first check the printed call number index to determine whether a book with that call number has been circulated prior to the last updating of the index and failing here, will then key the full call number at the terminal where an immediate search of all books added to the index since the last updating of the master file will be initiated. Once the call number has been located, the attendant will keyboard the Book Identification Number assigned to that book and the system will initiate a search of the master circulation file stored on disk at the Central Library Data Processing Facility. If the number is not found in the main circulation file, the system will proceed to check the current day's circulation transaction records. Even using unsophisticated file search techniques during the peak circulation period at the largest campus, the maximum response time will be considerably less than one minute. If the system locates the record for a desired book, it will display on the screen of the CRT the date due and borrower's identification number. If the patron wishes to place a hold on the book, the attendant will either keyboard the Borrowers Identification Number, if he is not present, or read it with a light pen if he is and then keyboard the Book Identification Number for the book which he would like the library to hold for him when it returns. If the patron would like to know who currently has the book he wants, he may check the Borrowers Identification Number found in the circulation record as displayed on the CRT

screen in the current printed index to Borrower Identification Numbers.

Another possible result of the on-line file search of circulation records is the discovery that the desired material is "charged" to some special location in the library such as the Reserve Book Room, the Bindery, the Bibliography Room, the Reference Room, or some other special shelving location.

If an outstanding charge record for the desired book is not located, the attendant may note that the material is apparently lost by keying the Book Identification Number and a special lost book code.

Where the book desired by a patron or a library department such as the Reserve Book Service is subject to recall, the attendant may initiate a recall action using the same procedure he uses for placing "hold" on returned materials with the exception that a special recall code is keyed into the record instead of the code indicating that the book is to be held upon return.

To insure that the library has the patron's most recent mailing address at the beginning of each quarter, the patron will be given the option of either letting the system mail the notification of available material to an address stored in the patron registry file or to an address which the attendant will key into the system at the time the hold or recall record is keyed.

In some special urgent situations, the circulation attendant may choose to telephone the patron currently charged with the material and request that he return the material immediately. In any case, the holds and recall messages will be transmitted to the Central Data Processing Facility for batch processing that evening. The file of recall notices will be prepared by the central facility and transmitted back to the campus for printing on a universal self-mailer form that will be ready for mailing the next morning. At the time a new hold request is keyed into the system, the Book Identification Number together with a hold code will be added to a small file representing books requiring exception action during charge

or discharge.

Periodically the central data processing facility will prepare a listing of books in call number order which have been reported missing to facilitate searching for these materials. The system will automatically include a book on the list at pre-determined intervals until the circulation librarian declares the book permanently lost or indicates that it has been located.

Patrons may be notified that material which they have requested is now available in any one of a number of ways. When such material is discharged, the circulation terminal will automatically prepare a slip of paper containing the Borrowers Identification Number and the Book Identification Number. These notices can be displayed immediately on a bulletin board provided for that purpose. Second, the circulation attendant may check the patron registry and telephone the patron to indicate that the material is now available. Third, that night during the batch processing run, a system will prepare book availability notifications which will be transmitted back to the campus the next morning to be printed on the universal self-mailer forms ready for the first mail pick-up that morning. The system will also prepare for printing at the campus each morning a listing of names of patrons for whom the library is currently holding materials to be posted on the bulletin board provided for that purpose.

1130 SOLVE PROBLEMS. The system will probably have a rather minimum effect on the number of special problems which occur in connection with helping patrons obtain books they have not been able to find on the shelf.

1131 CHECK CHARGE RECORDS FOR LOCATION. The steps involved in locating the Book Identification Number associated with the particular call number provided by the patron and keyboarding this number into the system may turn out to be more time consuming than searching a manual file of charge records. On the other hand, where several manual files must

be checked or where the circulation file is maintained at a remote location, the mechanized procedure might be less time consuming. On the whole, this does not appear to be a very impactable task.

1132 TAKE REQUESTS FOR HOLDS & RECALLS. Because all manual record preparation is eliminated, the new process of requesting that materials be held is considerably simpler than with the manual system. Because it is simpler, the number of requests for holds and recalls may increase. The time involved in negotiating the request with the patron will remain relatively unaffected by adoption of a mechanized procedure. Thus, this is only a moderately impactable task.

The system will provide the option for automatically shortening the loan period when a number of people are waiting to use the same material. When a library chooses to exercise this option, the loan period will be dropped to one week whenever three or more people are waiting to use the same book simultaneously will generate a historical report on the use of that particular book together with an indication of the number of holds currently against it for review by an acquisitions librarian who may want to acquire additional copies of the work.

1133 ISSUE RECALL NOTICES. The preparation of all notices to be mailed to the patron will be handled automatically by the system. The system will have almost no effect on the amount of time spent notifying patrons by telephone.

1134 SEARCH FOR MISSING BOOKS. The new mechanized system will completely eliminate all of the manual record keeping connected with searching for missing books. Furthermore, the system will remember the specified search schedule for each missing item and will remind Library Assistants when it is time to make another search for the item. The system will prepare searching lists in call number order to expedite the process. However, the time consuming process of physically searching through the stacks for the missing material will remain almost totally unaffected by the new system.

Through the use of simple physical inventory procedures which reduce the number of lost books, time spent searching may decline eventually.

1135 MAINTAIN HOLD SHELF. The system will periodically prepare a list of books which have remained on the hold shelf beyond a pre-specified period to be returned to the stacks. These books will be removed from the hold shelf and added to other returned books to be discharged in the usual way. Thus, some record-keeping activity will be eliminated.

1136 TELL PATRON BOOK AVAILABLE. The system will automatically prepare all book availability notices on a universal self mailing form so that the circulation attendant will need to be very little concerned with the process. Telephone notifications will continue pretty much unaffected by the new system.

11.4 LONG TERM LOAN LIST PRODUCTION MODULE. On demand, the system will select from the master circulation file for the campus all items charged to patrons on a permanent or long term loan basis. The system will prepare a separate listing for each patron. Because most patrons having materials on a long term basis will be faculty, the system will transmit the list information back to the campus where it will be printed in duplicate. Both copies will be sent to the concerned faculty member with the request that a physical inventory of his library materials be made and that one copy of the list marked to indicate materials still required be returned to the library where any discrepancies which are found may be resolved. When the list is returned, the library attendant will key into the system at the CRT terminal the faculty member's Borrower Identification Number and a code indicating that his physical inventory has been satisfactorily completed. The system will maintain a follow-up file and will automatically regenerate the long term loan lists for those faculty which fail to respond before the pre-determined follow-up date.

1140 SOLVE PROBLEMS. The system will have almost no effect on the main problems concerned with this module, namely finding time to do this relatively low priority task. Handling discrepancies and dealing with absent-minded faculty who cannot find time to do a physical inventory will continue to consume as much time as before the new system was installed.

1141 PREPARE LISTS FROM CHARGE RECORDS. This is a nearly totally impactable task, because the system handles all the necessary file searching and list preparation. The preparation of instructions for performing the physical inventory can be prepared by the machine along with the lists so that the only manual task which will remain is the preparation of the lists for mailing. This is a highly impactable task.

11.5 INTERLIBRARY LOAN CONTROL MODULE. Much of the activity involved in controlling interlibrary loans will continue to be performed much as they are now. The patron must be individually qualified and so must borrowing libraries. When a library patron requests that a book be located for him through interlibrary loan, an appropriate source for that material must be located through a manual search of available book catalogs representing the holdings of cooperating libraries. When the full UC Bibliographic Record Subsystem has been implemented, it may be possible to use mechanized procedures to determine whether or not the University of California holds the required material in any of its libraries. However, for some time, the search will continue to be handled manually using a variety of book catalogs.

On the other hand, there is currently a tremendous amount of record keeping involved in controlling interlibrary loans in most of the libraries of the University of California. Much of this record keeping activity can be eliminated by processing circulation records connected with interlibrary loans through the main mechanized circulation operation. Once the material required by a library patron has arrived in the library, the machine readable labels can be affixed to the inside back cover of the book and the material charged in the

same manner used for other materials held by the library. Similarly, when the library agrees to loan materials to other libraries, it would establish the other library as an authorized borrower with an assigned Borrower's Identification Number and charging would again proceed as with ordinary materials. All circulation records would be maintained by the Standard Loan Subsystem and the system would automatically take the necessary follow-up actions in connection with overdues, etc. By tagging all interlibrary loan charge records with a special code, listings of all outstanding transactions could be prepared for visual inspection by interlibrary loan librarians on demand.

No doubt the use of the ALA Interlibrary Loan Forms would continue to be required and these would need to be filed as they are now under the existing manual systems.

A great deal of the follow-up correspondence to verify that material has been sucessfully returned to another library can be eliminated by including in each item returned a self-addressed business reply post card containing the ILL Transaction Number and a note to the effect that the material has been received in good shape by the loaning library and that it is safe for the borrowing library to clear its records.

1150 SOLVE PROBLEMS. Because the actual charging and discharging functions will be handled by the MAIN circulation procedures so that all of the necessary follow-up records are maintained by machine, some reduction in the number of problems associated with the handling of interlibrary loans can be expected. Aside from the circulation functions, the new mechanized system will have almost no effect on the quantity or nature of problems encountered in interlibrary loan operations.

1151 PREPARE REQUESTS FOR PROCESSING. Utilizing the mechanized circulation procedures, it may be possible to simplify the filing requirements somewhat. Generally speaking, however, the new mechanized systems will have little impact here.

1152 CHECK HOLDINGS. The new mechanized circulation procedures may permit missing books to be located somewhat more quickly, but on the whole they will have almost no impact on this task.

1153 PROCESS REQUEST. The use of a mechanized circulation procedure may permit simpler filing to be used so that some savings might be possible. However, on the whole, mechanization will have almost no impact on this task.

1154 FILE REQUEST. Filing procedures at many campuses are relatively complex and the adoption of mechanized circulation procedures should permit significant simplifications to be adopted. For example, every ILL form could be annotated with the Book Identification Number and filed by that number providing the system kept track of the necessary follow-up dates and automatically took the required action, and providing the systems could provide the Book Identification Numbers when only the borrower's name is known. Both of these are requirements for the new Standard Loan Subsystem. Thus, there would be no need for maintaining multiple files in order to provide access by borrower, lending library, and book identification.

A book received from a lending library would be processed for circulation by affixing a machine readable book identification label to the inside back cover. A second label, containing the same number would be affixed to the ILL form so that it could be filed by that number. The Book Identification Number on library books being sent to other libraries would simply be handwritten on the ILL form and the form would then be filed by the book ID Number.

All queries regarding ILL books in circulation would first be channeled through the file query facility of the Standard Loan Subsystem. By giving both borrowing and lending libraries Borrower Identification Numbers and placing a "hold" on the borrowed book for the lending library at the time the book charged to a patron, queries from lending libraries regarding ILL books in circulation could be satisfied by

requesting the circulation status of all books for which the lending library currently had "holds" placed. Consequently, significant amounts of the filing now necessary with the manual procedures could be eliminated. The same comments hold true for the SECONDARY operations which are able to use the MAIN procedures.

1155 CHARGE BOOK TO BORROWER. Books to be charged to borrowing libraries will be handled the same way as books being charged to a patron who has misplaced his ID card. The Book ID Label will be machine read and the borrowing library's Borrower's Identification Number will be keyed at one of the CRT terminals. The interlibrary loan operation will have available a printed listing of Borrower Identification Numbers for each of the libraries which has previously borrowed material from the library. First time borrowers will be assigned a Borrower Identification Number just as any new patron would be assigned a number the first time he used the library. After the Borrower ID Number is located or assigned, it will be written on a slip of paper and inserted in the book to be loaned to the other library.

Periodically a library page will take the ILL books to the nearest circulation station where they will be charged and then returned to the interlibrary loan operation for mailing to the borrowing library. Some savings in the time required to prepare records and the time to file records can be expected after the installation of the new mechanized circulation procedures.

A significant savings can be anticipated in the time required to charge ILL borrowed books to library patrons. Here, after the ILL personnel have affixed a machine readable label to the ILL form and to the inside back cover of the borrowed book, the book is released to the patron to be charged like ordinary books owned by the library. All of the necessary file maintenance procedures and follow-up actions will be handled by the mechanized circulations operation automatically.

1156 PROCESS BOOK FOR MAILING. The new mechanized procedures will have almost no impact whatsoever on this task. Because a lending library is treated like a patron who has placed a hold on the ILL book, the system can be expected to prepare the mailing label necessary for returning the material and this could conceivably speed up the process.

1157 OBTAIN PHOTOCOPY OF ORIGINALS. The new mechanized procedures will have absolutely no impact on this task.

1158 CLEAR RECORDS ON RETURN. Because the mechanized circulation procedures maintain all of the charge records and because the filing procedures within the interlibrary loan operation have been significantly simplified, this task must be considered highly impactable. ILL Forms would be retrieved by Book Identification Number using the information on the label on the inside back cover of the book which has been returned for mailing back to the lending library. ILL forms for books mailed back to the borrowing library would be similarly retrieved before the book was sent on to the nearest circulation station for normal discharging.

Those SECONDARY operations which are able to use the MAIN circulation procedures would be similarly impacted by the new mechanized procedures.

11.6 PATRON REGISTRY MAINTENANCE MODULE. The qualification of patrons will continue, undoubtedly, as it is now under the existing manual systems. Every library user will need to be issued a machine readable identification label to be applied to the back of some identification card which he carries. At the time he is issued this label, he will be required to provide his name and social security number as identification. Patrons may at any time (and at their option) provide an up-to-date address for use by the library, but ordinarily the name and address data will be obtained from other departments on campus which have been charged with

primary responsibility for maintaining this information. Specifically,the UC Student Registration System will provide name and address information about students and the UC Personnel Systems will provide name and address information about faculty and staff. Community and other special users of the library will be required to provide full address information at the time they are qualified as borrowers.

Special remote batch processing runs will be made for each campus on an individual basis, if necessary, to get the name and address information in the local campus format transmitted from each campus computer facility to the libraries' central data processing facility. The patron registry information thus obtained, will be transmitted back to the library data processing facility at the campus for the preparation of the printed copy of the patron registry on demand.

1160 SOLVE PROBLEMS. Because address information may not be available for many students at the beginning of each quarter and because the system must have access to the most recent address for each patron, some significant increase in problems should be anticipated with the implementation of mechanized circulation procedures. Problems resulting from frequently changed student addresses will, no doubt, increase in number.

1161 PROCESS LIBRARY CARD REQUESTS. Every patron will need to be issued a Patron Identification Label to be affixed to the back of some plastic identification card -- either his own or one provided by the library. At the time a patron is issued such an ID number, he will be asked to identify himself and to record his name and social security number on a form provided for that purpose. The form will initially contain two machine readable labels containing the same Borrower ID Number. One will be affixed to the borrower's card and the other will be used for telling the system which ID number to associate with that borrower's social security number.

As circulation Library Assistants have time, they will wipe the light pen across the machine readable labels on

by the patron. These forms will then be temporarily filed in Borrower ID Number order and the system will batch process the data that evening and present the next day for review the full Borrower Identification Record for comparison with the information recorded on the form. If the name matches, and the patron has indicated no change of address, the Library Assistant will indicate the acceptability of the record by keying an appropriate code and will continue through all of the remaining records. If a record with an incorrect name is located, the Library Assistant will check the printed listing of patron names in order to determine where the difficulty is. Where data has been erroneously keyed, the Library Assistant will keyboard a code indicating that the erroneous record is to be discarded and will add the previously incorrectly keyed patron registration form to the batch of new forms to be rekeyed at a later time.

Generally speaking, this will be a new task at most libraries and will consume a significantly greater amount of time than is now expended issuing special borrower permits.

1162 PREPARE MONEY FOR DEPOSIT. While the system may prepare post-audit reports indicating the amount of money which should have been collected from special borrowers, it is not likely that the new mechanized procedures will have much impact on the tasks which must now be performed manually.

1163 MAINTAIN PATRON ADDRESS LISTS. The number of address changes handled directly by the library, in all likelihood, will increase even though some other campus department is charged with maintaining the student address file and providing the updated information to the library in a machine readable form. Additional time will be involved on the part of library staff members to insure that the new update information is made available to the Central Processing Facility and to handle the updated versions of the printed patron registry lists which the system will produce on demand several times a year.

11.7 OVERDUE BOOK PROCESSING MODULE. Each evening, or at other specified intervals, the Central Data Processing Facility will generate files of overdue notices from all charge records for materials which should have been previously returned. These will be transmitted back to the campus to be printed on the universal self-mailer form the next morning in time to be sent out in the morning mail. For those campuses which have elected to do so, the system will add the Borrower ID Number for those patrons having overdue materials to the list of Borrower ID Numbers checked during each charging transaction which requires some form of exception action. This information can be used at the time of charging to deny such delinquent patrons further borrowing privileges until the overdue materials have been returned to the library or at least properly renewed.

When overdue materials are finally returned to the library, the system will automatically prepare bills for those libraries which choose to charge fines and will print the bills centrally on self mailer forms in zip code order so that bulk postage rates may be used. The system also will prepare reports for each campus business office summarizing in a form convenient for them the bills which have been sent out to library patrons.

Books which are finally declared lost will initiate the preparation of a bill for a replacement value based on the average cost of books in the subject area represented by the LC classification or on a manually entered replacement value plus an additional assessment representing the actual processing costs associated with acquiring a replacement copy. Replacement billing costs will be established by each library independently.

The system will automatically prepare requests to the Acquisitions Librarian for replacement copies of books determined to be lost. Information will be extracted from the history file to indicate the extent of the prior use of the material as an indication of the need for replacing the lost material. The system also will query the historical

order file in an attempt to locate the original ordering record so that this information can be included on the report sent to the Acquisitions Librarian. These reports will be in the same format and contain the same data elements as the original purchase recommendations received from patrons to facilitate the processing of new orders, if the Acquisitions Librarian deems this to be justified.

1170 SOLVE PROBLEMS. The number of problems that a particular library has to solve with the installation of the new mechanized procedures will depend greatly on the particular mode of operation which they choose to adopt. Th , those libraries which choose to do away with fines might anticipate fewer problems. On the other hand, patrons who receive overdue notices with less complete bibliographic descriptions of the materials with which they are charged might ask for assistance in identifying these items more frequently. One might guess that the average level problem solving will remain relatively the same.

1171 PROCESS OVERDUE CHARGE RECORDS. This is a nearly totally replaceable task because the mechanized portion of the new system will handle almost all of the record maintenance functions including the identification of books which are currently overdue. Because provisions must be made for manually overriding the automatic overdue processing functions to respond to special situations, some manual activity must continue to be expected.

1172 ISSUE OVERDUE NOTICES. The system will perform this function automatically so that the Library Assistant's task will be reduced to transporting the overdue notices to the mail room. This is a highly impactable task.

1173 FILE RECORD OF OVERDUE NOTICES. Because no manual circulation files will be maintained and because the system will take all of the necessary follow-up action required to ensure that overdue materials are eventually returned, there will be no need for manual records of overdue notices. This

1174 TELEPHONE ABOUT OVERDUE ITEMS. The new mechanized procedure will have no impact whatsoever on this task and the amount of time spent here will depend strictly upon the library's service policies.

1175 PREPARE BILLS AND SEND OUT. The system will automatically prepare bills for overdue fines and lost books and will print them out on universal self-mailer forms ready for mailing. Before the forms are actually printed the system will display the billing information to a Library Assistant on the screen of the CRT so that unusual situations may be investigated more thoroughly before the bills are actually sent. This is a nearly completely replaceable task.

1176 INITIATE LOST BOOK REORDERING. Whenever a book has been declared lost by a Circulation Librarian, the system will automatically assemble available information about the work for review by an Acquisitions Librarian. While the time spent in initiating an order for a lost book may be reduced, the number of lost books discovered by the mechanized system will likely increase, adding more work. On the whole, we might expect some minimal amount of reduction in the time spent on this task.

1177 PROCESS LOST BOOKS WHICH ARE FOUND. While the mechanized procedures should eliminate a great deal of manual handling of records in connection with reinstating lost books and cancelling all of the various records which have been prepared when it was thought that the book was lost, the number of reinstatements will probably increase, offsetting much of the savings which might otherwise be realized.

C.	TASK BY MODULE	ESTIMATED % REPLACEABILITY OF EXISTING LABOR					
		Main Operations			Secondary Operations		
		Low	Best	High	Low	Best	High
	ORDER SUBSYSTEM						
	6.1 SURPLUS CONTROL MODULE						
00	Solve problems	10	20	30	0	0	10
01	Prepare correspondance	30	40	70	0	10	30
02	Act on correspondance	10	20	30	0	0	10
03	Process duplicates	10	20	30	0	0	10
	6.2 ORDER INITIATION MODULE						
00	Solve problems	0	10	50	0	0	10
01	Check requests for missing data	10	50	90	0	30	40
02	Provide missing data on requests	50	60	80	0	20	30
03	Prepare order forms and mail	40	50	70	0	20	20
04	Prepare order letters and mail	30	40	60	30	40	60
05	Telephone or TWX orders	0	0	20	0	10	20
06	Prepare pre-order correspondance	10	50	90	0	20	30
07	Process library records of orders	70	80	90	30	60	80
08	Process order cancellations	20	40	50	0	20	30
09	Process ceased publications	40	60	90	0	10	20
10	Process dealer reports	20	30	60	0	20	40
	6.3 CLAIMS PROCESSING MODULE						
00	Solve problems	0	10	30	0	0	10
01	Search files for needed action	80	80	90	50	80	90
02	Prepare non-serials claims	50	80	90	50	80	90
03	Prepare serials claims	20	30	50	20	30	50
04	Telephone or TWX urgent calls	0	20	30	0	10	20

	TASK BY MODULE	ESTIMATED % REPLACEABILITY OF EXISTING LABOR					
		Main Operations			Secondary Operations		
		Low	Best	High	Low	Best	High
	ORDER SUBSYSTEM						
	6.3 CLAIMS PROCESSING MODULE						
05	Handle and process material	10	20	30	0	10	20
06	Claim missing invoices	70	80	90	30	50	60
07	Process responses to claims	-20	0	50	-30	0	30
	6.4 RECEIVING MODULE						
00	Solve problems	10	30	40	0	10	30
01	Unpack and arrange materials	-10	0	10	-10	0	10
02	Check material and record receipt	30	50	60	10	20	50
03	Prepare material for next process	-40	-20	0	-40	-10	0
04	Relocate order records	70	90	100	30	60	80
05	Make new receivin records	90	100	100	0	20	100
	6.5 INVOICE PROCESSING MODULE						
00	Solve problems	-50	-10	0	-30	0	10
01	Prepare invoice for processing	50	60	80	50	60	80
02	Reconcile invoice with shipment	30	40	80	30	40	80
03	Process invoice for payment	70	80	90	70	80	90
04	Prepare invoice for accounting	80	90	100	80	90	100
05	File copy of invoice	0	20	30	0	20	30
06	Obtain and use credit memos	40	50	80	40	50	80
08	Order government coupons	0	10	10	0	10	10
09	Process other payment forms	30	40	80	30	40	80

NO.	TASK BY MODULE	ESTIMATED % REPLACEABILITY OF EXISTING LABOR					
		Main Operations			Secondary Operations		
		Low	Best	High	Low	Best	High
	ORDER SUBSYSTEM						
	6.6 VENDOR FILE MAINTENANCE MODULE						
6600	Solve problems	0	40	50	0	10	20
6601	Maintain and use file	40	50	90	0	20	30
	6.7 WANT LIST PROCESSING MODULE						
6700	Solve problems	-30	-10	30	-20	0	30
6701	Sort and file OP requests	70	80	90	40	60	70
6702	Decide when and where to mail	20	30	50	20	30	50
6703	Send out OP want lists	60	70	90	30	50	60
6704	File copies of OP want lists	90	90	100	40	60	70
6705	Follow up and reissue lists	60	70	100	40	50	80
6706	Process dealers reports	10	30	80	10	30	70
6707	Search catalogs for wants	20	40	50	10	20	50
	STANDARD LOAN SUBSYSTEM						
	11.1 BOOK CHARGING MODULE						
1110	Solve problems	-20	0	20	-20	0	30
1111	Charge book to patron	50	70	90	0	30	40
1112	Process charge documents	80	90	100	30	30	30
1113	Renews book charges	50	70	90	0	30	40
1114	Waiting at circulation desk	0	50	100	0	20	70
1115	Collates special material	-50	-20	0	-20	0	0

NO.	TASK BY MODULE	ESTIMATED % REPLACEABILITY OF EXISTING LABOR					
		Main Operations			Secondary Operations		
		Low	Best	High	Low	Best	High
	STANDARD LOAN SUBSYSTEM						
	11.2 BOOK DISCHARGING MODULE						
1120	Solve problems	-20	20	60	-20	0	20
1121	Unload book drops	20	20	30	10	20	30
1122	Discharge books	70	80	90	20	30	30
1123	Process discharge records	80	90	100	30	30	30
1124	Process books for repair	-50	-30	0	-20	-10	0
1125	Check books for holds	60	70	90	20	20	30
1126	Prepare books for shelving	40	50	80	10	20	30
1127	Collate special material	-50	-30	0	-20	-10	0
	11.3 HOLDS & RECALL PROCESSING MODULE						
1130	Solve problems	0	0	10	0	0	0
1131	Check charge records for location	-30	0	30	0	0	0
1132	Take request for holds and recalls	0	20	30	0	0	10
1133	Issue recall notices	10	50	60	0	20	20
1134	Search for missing books	0	20	30	0	0	10
1135	Maintain hold shelf	10	20	40	0	0	10
1136	Tell patron book available	20	50	80	10	20	20
	11.4 LONG TERM LOAN LIST PRODUCTION MODULE						
1140	Solwe problems	-10	0	10	0	0	0
1141	Prepare lists from charge records	70	80	90	20	20	20

NO.	TASK BY MODULE	ESTIMATED % REPLACEABILITY OF EXISTING LABOR					
		Main Operations			Secondary Operations		
		Low	Best	High	Low	Best	High
	STANDARD LOAN SUBSYSTEM						
	11.5 INTERLIBRARY LOAN CONTROL MOD.						
1150	Solve problems	0	20	30	0	0	10
1151	Prepare requests for processing	0	0	10	0	0	0
1152	Check holdings	0	0	10	0	0	0
1153	Process request	0	0	10	0	0	0
1154	File request	40	40	80	20	20	30
1155	Charge book to borrower	50	60	80	0	30	40
1156	Process book for mailing	0	0	10	0	0	0
1157	Obtain photocopy of originals	0	0	0	0	0	0
1158	Clear records on return	50	60	80	20	20	30
	11.6 PATRON REGISTRY MAINTENANCE MOD						
1160	Solve problems	-1000	-500	-300	-300	-200	-100
1161	Process library card requests	-200	-50	-30	-60	-20	-10
1162	Prepare money for deposit	-20	0	10	0	0	0
1163	Maintain patron address lists	-200	-100	-50	0	0	0
	11.7 OVERDUE BOOK PROCESSING MODULE						
1170	Solve problems	-50	0	30	-50	0	10
1171	Process overdue charge records	50	80	100	20	30	30
1172	Issue overdue notices	60	80	90	20	30	30
1173	File record of overdue notices	80	90	100	30	30	30
1174	Telephone about overdue items	0	0	0	0	0	0
1175	Prepare bills and send out	80	80	90	30	30	30
1176	Initiate lost book reordering	-20	10	50	0	0	20
1177	Process lost books which are found	0	10	20	0	0	10

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